

US EPA ARCHIVE DOCUMENT

Pennsylvania Nonpoint Source Program FY2005 Annual Report

Measuring Project and Program Effectiveness

4 Colored Pictures

October 1, 2004 through September 30, 2005

Section 319(h)(11) of the Federal Clean Water Act requires states to report annually on progress in meeting milestones included in their approved Non-point Source Management Program.

Pennsylvania's Nonpoint Source (NPS) Liaison Workgroup provides the majority of information included in Pa's NPS Annual Report. The Pa Department of Environmental Protection, Nonpoint Source Management Program, assists the NPS Liaison Workgroup in this effort.



***Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Watershed Management, Division of Watershed Protection***

- March 14, 2006 -

FOREWORD

Pennsylvania's Nonpoint Source program is graded on a national level by water quality improvements. This means (1) delisted stream reaches, (2) streams meeting water quality standards and designated uses, and (3) nonpoint source pollutant load reductions. Watershed success stories are also a measure of success. How do we measure up to the Environmental Protection Agency (EPA) Strategic Water Plan goals and Pa. Nonpoint Source Management Program goals are also part of the criteria for program success. We are currently involved with Phase III of Watershed Implementation Planning which is directed to: Total Maximum Daily Load (TMDL) approved watersheds with load reduction goals; Developing Watershed Implementation Plans (WIP) which EPA then acknowledges; Implementing recommendations to meet TMDL goals. Pennsylvania wants to include some funding for implementing Watershed Protection measures through the Watershed Implementation Plan process. Most funding is now directed towards Watershed Restoration measures in the WIP process.

The FY2005 Nonpoint Source Annual Report is a summary of progress over the Federal fiscal year (October 1, 2004 thru September 30, 2005). The Nonpoint Source (NPS) Liaison Workgroup and the Pennsylvania Department of Environmental Protection (DEP), Bureau of Watershed Management, Division of Watershed Protection, provide the bulk of the input to Pa's annual report. Semi-annual meetings of the Nonpoint Source Liaison Workgroup are the primary mechanism for agencies and organizations other than the Pa DEP. The workgroup provides input to and recommendations for Pennsylvania's NPS Management Program. The Pa DEP is currently revising its NPS Management Program - 1999 Update to better address EPA Strategic Water Plan goals and changes Pa DEP and partner organizations' programs.

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EXECUTIVE SUMMARY

Pa Nonpoint Source Management Program

Pennsylvania's Nonpoint Source Management Program – 1999 Update, Goals and Objectives (Part A) are the groundwork for which we measure our accomplishments. The majority of the NPS program goals and objectives included in the 1999 Nonpoint Source Management Program Update have been successfully met or exceeded. These have been reported to the EPA and public in previous NPS Annual Reports. For a quick reference, please refer to www.depweb.state.pa.us and Search for Nonpoint Source Program. Goals and Objectives in the Update are addressed in Section II.

NPS Program Update

Pennsylvania is in the process of updating its NPS plan, last updated and approved by the EPA in 1999. The update includes a variety of regulatory, non-regulatory, financial and technical assistance programs needed to improve and maintain surface and groundwater quality, and outlines the Commonwealth's plans to address non-point source pollution over a five-year period. Pennsylvania began a NPS Management Program Update in 2004. That document is expected to be out for public review and comment in early 2006.

Comprehensive Watershed Initiatives

Section 319 Nonpoint Source Implementation Program

We are providing substantial funding to comprehensive watershed initiatives throughout the state, e.g. Christina-Brandywine River Basin; Codorus Creek Restoration; Octoraro Creek Restoration.

EPA Targeted Watershed Initiative Grant

The Schuylkill River watershed in southeastern Pa. received an EPA Watershed Initiative grant, providing over \$1 million for NPS problem abatement in the AMD, agriculture, and storm water areas.

Nonpoint Source Grants and Funding

The Section 319 Nonpoint Source Implementation Program and the state-funded Growing Greener Initiative are the two primary sources of nonpoint source funding for watershed protection and restoration grants in the state. Section 319 funding is an annual allocation from the EPA, while Growing Greener funding is generated through a tipping fee charged per ton of solid waste disposed in Pa. landfills. Table 1 highlights funding received from Section 319, Growing Greener, and the Targeted Watershed Initiative grant.

Table 1. Funding Allocations from Section 319/Growing Greener/ Targeted Watershed Initiative Grant

Funding Source	Grant Year	Amount (in millions)	Award Date
Section 319			
	FFY1991-2004	\$56	
	FFY2005	\$5.9	September 2004
	FFY2006	\$5.9	TBA
Growing Greener I			
	1999-2004	\$163	
	2005	\$9.3	November 2005
Growing Greener II	2005	\$14.4	November 2005
EPA Targeted Watershed Initiative Grant	N/A	\$1.15	2004

- Pa.'s FFY2006 Section 319(h) grant application for \$5,900,100 was filed electronically on July 27, 2005.
- Pa. has received more than \$61.9 million from the federal Clean Water Act, Section 319 Program from FFY1991 through FFY2005.
- The Environmental Stewardship and Watershed Protection Act (Act 68 of 1999), also known as Growing Greener, provided \$5.5 million for watershed protection in September 2004.
- In July 2005, the Environmental Stewardship and Watershed Protection Act was amended (Act 45 of 2005) to include \$625 million in proceeds from bonds issued over the next 6 years. This part of the Growing Greener Initiative is called Growing Greener II. Growing Greener II funded \$14.4 million in watershed restoration in November 2005.
- The Growing Greener Initiative has provided more than \$172 million in watershed restoration and protection grants since 1999. Local sponsors have added another \$397 million from other sources.
- An EPA Targeted Watershed Initiative Grant for \$1.15 million was awarded to the Schuylkill River Action Network (SAN) in 2004. See www.schuylkillactionnetwork.org.

State Surface Water Quality Assessment (SSWAP)

Pa.'s water resources include 86,000 total miles of rivers and streams. This is a Pa DEP estimate based on 1:24,000 scale GIS stream coverage. Monitoring data included in Pa's 2004 Integrated List of All Waters indicates 84 percent of the assessed stream miles support the designated fish and aquatic life use. Impairment is reported in 16 percent of the assessed miles. A total of 40 percent of the assessed lake acres support designated fish and aquatic life uses, while 60 percent have been assessed as impaired.

Watershed Implementation Plan Development

Pennsylvania's Section 319 NPS Management Program has completed several Watershed Implementation Plans for TMDL-approved watersheds. These plans have been focused

primarily in small AMD or agriculturally impacted watersheds. Twenty Implementation Plans have been undertaken during Phase I and Phase II. Twelve of these Plans have been completed and reviewed by EPA Region III's NPS program, and eight are now in the initial stages of implementation.

Conservation Reserve Enhancement Program (CREP)

Additional CREP funding for riparian buffers were allocated within the original 20-county CREP area in the lower Susquehanna River Basin.

National Monitoring Program Projects

Three of four National Monitoring Program (NMP) projects continue. The three projects are,

- The Villanova University Urban Storm Water Best Management Practices (BMPs) demonstration site in southeast Pennsylvania was approved as an EPA Section 319 National Monitoring Project (NMP) in October 2003 (www.villanova.edu/vusp);
- The Swatara Creek NMP to monitor impacts of AMD restoration projects in south central Pa., (www.bae.ncsu.edu/programs/extension/wqg/319index.htm);
- Stroud Water Research Center NMP monitoring a riparian reforestation in agricultural land use in southeastern Pa. More information on the Stroud project are available on the Stroud website (www.stroudcenter.org).

The Pequea and Mill Creek NMP (effectiveness of stream bank fencing) project has been completed. The final published report will be available from the USGS, Water Resources Division, New Cumberland, PA. See (<http://pa.water.usgs.gov>) or (www.bae.ncsu.edu/programs/extension/wqg/319index.htm).

Conservation District Watershed Management

Conservation districts (CD) continue to play an important role as the Growing Greener funds support 64 watershed specialists in county conservation districts and the City of Philadelphia Water Department. Pennsylvania's Growing Greener Initiative provides financial support for these positions.

Highlights

Water Quality Improvements

- 30 stream miles in two watershed that were polluted from nonpoint sources are now cleaned up as a result of restoration activities.
- Eight other streams polluted from NPS sources have shown progress in being cleaned up as a result of restoration efforts.

Agriculture

- Approximately 148,000 acres of the 250,000 acres goal for the Susquehanna River Conservation Reserve Enhancement Program (CREP) has been achieved.
- The CREP program has been expanded into the Ohio River basin with a goal of 65,000 acres participation.
- Pennsylvania Legislature known as the Agricultural Community and Rural Environment Act (ACRE) was passed. It incorporates updates in nutrient management and permitting.
- To date more than 1,640 miles of forested riparian buffers have been planted statewide.

Resource Extraction

- The Boggs Road Mine Drainage located in the Montour Run Watershed was completed in 2005. The passive treatment system includes a forebay and an aerobic wetland complex consisting of bioswales, settling ponds and wetlands. The system is preventing between 8,000-10,000 pounds of metals annually from entering South Fork Montour Run.
- Three DEP, Bureau of Abandoned Mine Reclamation (BAMR) projects completed on Clover Run, Jefferson County; Pegrin Run, Cambria County; and McCune Run, Westmoreland County improved water quality on 8.2 miles of streams.
- Efforts to turn pollutants extracted from mine drainage during the treatment process from a waste product to a resource continue. Examples include recovery and use of iron oxide. Iron oxide is used as a pigment in a number of products, including paint. The goal is to help allow treatment systems to pay for themselves.

Construction and Urban Runoff

- 8 counties are completing countywide Stormwater Management Plans that require stormwater BMPs protect and maintain water quality
- Statewide, 49 counties have completed 101 storm water management plans involving 865 municipalities. An additional 24-storm water management plans and updates are being prepared and reviewed. To date, more than \$14 million have been appropriated by the legislature for the stormwater management grant assistance program.
- EPA Region III, PADEP, and Philadelphia Water Department (PWD) have partnered together to form the Schuylkill Action Network (SAN) to reduce stream impairment through better stormwater management and to protect high quality streams from potential threats within the Schuylkill River Watershed. The SAN Storm Water Workgroup includes a subcommittee of land management, preservation, and conservation organizations given the critical role of land-use practices. Activities include education, outreach, and the implementation of best management practice (BMP) demonstration projects. Preparation of an Act 167 plan for the Schuylkill watershed is in progress.

Hydromodification

- Another fifteen dams were modified or removed bringing the total of dams removed or modified to 84. The 15 dams removed opened an additional 69.5 miles to fish passage bringing the total to 518.5 miles of stream habitat now open to migratory fish. On-stream dams in particular, impede the natural flow of the streams, often causing a thermal increase, deposition of accumulated sediment and low dissolved oxygen resulting in the destruction of macroinvertebrate habitat or disruption of fish passage.
- Approximately 75 Floodplain Management Ordinances in conjunction with the Map Modernization, Community Rating System and National Flood Insurance Programs were reviewed and updated to protect floodplains.
- DEP tracked 112 acres of wetlands restored/created and 666 acres enhanced for the year. (This is nonregulatory, Partners, etc.) The Commonwealth has restored or created 1766 acres and enhanced 5,657 acres since tracking began in 1998.
- The Keystone Stream Team (KST) website www.keystonestreamteam.org came on line as a resource on Natural Stream Channel Design for watershed organizations to use. Lycoming College's Clean Water Institute in conjunction with the KST and funded with a 319 grant

began a web-based database for NSCD data. This is a valuable tool for peer review and should help refine the science/art of NSCD and reduce costs.

Silviculture

- In 2005, a new field manual was developed combining two older publications aimed at controlling erosion and sedimentation (E&S) and protecting forested wetlands for timber harvesting operations. This new publication, along with an E&S template and gravel permit package for stream crossing, make up the Professional Timber Harvesters Action Packet provided to loggers.
- Two new forest landowner associations in 2005 bring the total to twenty-three statewide. These forest landowner association combined for twenty-six workshops and tours for addressing water quality issues relating to logging and forest management.

Lake

- Through funding provided by DEP, the Pa Lakes Management Association (PALMS), numerous groups were assisted or trained on lake management issues. PALMS and DEP also participated in and helped support the outreach efforts of Penn State Extension, which in 2005 provided a series of pond and lake workshops throughout the State. Topics covered lake/pond ecology and watershed concepts. Six Saturday workshops were conducted across the state
- As a result of changes made in 2005 on Chapter 93 Water Quality Standards for dissolved oxygen (DO) in lakes, a number of lakes and acres identified on the 2004 303(d) lakes list, a number of lakes and acres will be removed from the (impaired by pollution but not needing a TMDL) list and moved to the (meeting aquatic life use) list for 2006.
- Four Clean Lakes Projects, originally assessed and impaired in the 1990's and with approved TMDLs, are being tracked, both in-lake and by tributary inputs, to detect improvements in water quality as BMPs are implemented in the watershed. Based on the results of monitoring thus far, these lakes are on track for meeting designated uses in the next few years. Four additional Clean Lakes Projects with TMDLs have made significant but not complete efforts to install watershed BMPs, are making water quality improvement and are expected to be meet designated uses at a later time.
- The Pennsylvania Invasive Species Council (PISC) has reconvened in 2005 and a Management Plan Committee was formed. This Committee is reviewing management plans from other states in preparation for development of a final Management Plan for PA; this is PISC's top priority.

Land Disposal

- In 2005, locally sponsored hazardous waste collections involved 43 communities with 43,744 participants. More than 2,515 tons of material was collected.
- For 2005, the ChemSweep Program to properly remove unwanted pesticides took place in 15 communities, 229 on-site pickups and 6 central collection sites. All total, 125,129 pounds of waste pesticides were collected and properly disposed.

SECTION I.

Progress in Meeting NPS Management Program Milestones in approved State Management Program

Since the EPA requires us to report on our approved NPS Management Program, Pennsylvania's Non-point Source Management Program-1999 Update is the current management program for purposes of this annual report.

The approved milestones include both:

- (a) General over reaching Milestones for the entire non-point source program, and
- (b) More specific Milestones specific to each of the seven EPA-approved non-point source areas: Agriculture; Construction and Urban Runoff; Hydro-modification; Lakes; Land Disposal; Resource Extraction; and Silviculture (Forestry).

Pennsylvania's NPS Strategy, Long-term Goals and Short-term Objectives (pp. 1-4, Section I, 1999 Update NPS Management Program Update, September 1999), and any developments reached over the past year (October 2004 through September 2005) are included as follows:

Long Term Goals with Short Term Objectives

a. Conduct restoration activities in all nonpoint source impacted streams to attain designated uses.

This is an ongoing effort. The Pa DEP State Surface Water Assessment Program (SSWAP) documents designated uses and whether waterbodies are meeting those uses through watershed assessment. Information on waterbody delistings from the Integrated List of All Waters, where waters that were impaired are now meeting designated uses, will be included in Section II. as appropriate.

Nonpoint source restoration activity is focused through the Section 319 program on waterbodies with TMDLs, where watershed implementation plans have been developed, and in impaired reaches of watersheds.

b. Achieve a 33% net gain in healthy aquatic ecosystems by maintaining current levels of systems and restoring degraded ones.

Category I watersheds identified in the Unified Watershed Assessment received priority funding since the FY2001 grant. Pa's Growing Greener Program and Section 319 Nonpoint Source Implementation program focus watershed restoration where watersheds are degraded by nonpoint sources.

Section II in this report provides information on recent stream segment delistings, partial and fully restored waterbodies and Section 319 implementation work that has occurred in these watersheds, and nonpoint source pollutant load reduction estimates. These factors all contribute to net gains in healthy aquatic ecosystems. We do not have a measured change in healthy aquatic ecosystems at this time.

c. Coordinate watershed-based programs for local watershed restoration and protection efforts.

This is an ongoing effort. The NPS Liaison Workgroup input to Pa's NPS program, the CVMP Citizen Volunteer Handbook, Senior Environment Corps monitoring programs, and incorporating EPA grant guidance into Pa's NPS program have all taken place. These original objectives have all been met.

d. Increase by five per year the number of local watershed groups to develop and implement comprehensive watershed plans.

This goal has been met. Many new groups have been formed since 1999.

e. Develop new funding sources and utilize existing ones for remediation and restoration of NPS problems.

Several new conservation programs have been implemented through the 2002 Farm Bill, e.g. Conservation Security Program (CSP) and Conservation Reserve Enhancement Program (CREP).

The Pa Growing Greener Program was amended in July 2005. Growing Greener II will provide \$625 million in proceeds from bonds issued over the next 6 years. An additional \$630 million spending is projected over the next seven years from the original Growing Greener I Program.

The Section 319 NPS Implementation program grant award has decreased over the past few years. Priorities have shifted to emphasize Watershed Implementation Planning and restoration projects in TMDL-approved waters.

Pa's FY2006 Section 319 grant was submitted electronically in July 2005.

State Revolving Loan funds are available to Pa. property owners for on-lot septic system repairs. This assistance is provided through the Pennsylvania Infrastructure Investment Authority (PENNVEST).

f. Use GIS technology to show stream assessments, locate best management practices installed and track improvements, and use to help develop TMDLs.

GIS is used to help Pa's NPS program and the Growing Greener Program identify project locations. The Pa DEP State Surface Water Assistance Program (SSWAP) results are utilized as geographic information system (GIS) coverage; BMP locations are known; reporting and tracking environmental improvements is underway but has not yet been completed. The first complete round of the Pa DEP SSWAP is targeted for completion in 2005-6.

- g. Use incentives, assistance, education, and existing regulatory programs to conserve existing resources in site design and address NPS problems in watershed restoration plans.**

Many of these objectives have been completed.

The Conservation Reserve Enhancement Program (CREP) is being implemented in the Susquehanna and Ohio River basins.

PA's anti-degradation regulations have been amended.

PA's Chapter 102 regulations are being updated to include local and regional planning efforts that more comprehensively addressing site design.

The PA DEP has adopted final regulations for the Concentrated Animal Feeding Operation (CAFO) program.

The Agriculture, Communities and Rural Environment (ACRE) program (Act 38 of 2005) increases the breadth of farms that are considered CAFOs and require permits.

The Pennsylvania Association of Conservation Districts (PACD) outreach incorporates Better Planning Through Site Design in local county conservation district and municipal official trainings. Pa DEP Watershed Academy trainings have also focused on this topic.

- h. Develop or expand six NPS education and outreach efforts, and incorporate public input in all phases of PA's NPS program.**

All objectives in this goal have been met.

The PACD and PA LWV-WREN, Farm-A-Syst, Home-A-Syst, Section 319 Success Story publication, Clearinghouse for NPS and watershed technical, financial and communication resources are kept up-to-date.

Current information has recently been added to the NPS Management program homepage on PA DEP website www.depweb.state.pa.us.

The PA NPS Liaison Workgroup provides timely input and advice that benefits the Pa NPS program.

An annual Conservation District Watershed Specialist meeting provides an excellent NPS issue forum for the entire state.

i. Assure cost-effective and reasonable BMPs are achieved for NPS pollutant control.

Existing regulatory authority through Chapters 102 and 105, the Nutrient Management Act, and the Clean Streams Law help govern bmp implementation. These regulations include recommended BMPs for NPS controls.

PA's Dirt and Gravel Road Program and other programs are being implemented. The website <http://www.mri.psu.edu/centers/cdgrs/> provides current information from the Center for Dirt and Gravel Road Studies.

The BMP Handbook for Developing Areas was produced, distributed to all Pennsylvania municipalities, and training provided. Stream Corridor Restoration Handbook training has been provided.

j. Implement PA's 15-year program strategy for the Coastal Nonpoint Program.

The NOAA and EPA approved Pennsylvania's Coastal Nonpoint Pollution Program (CNPP) plan in 2001, with an exemption from the forestry and the agricultural irrigation management measures (PA CNPP Five-Year Implementation Plan and Fifteen-Year Strategy). Approval resulted in additional funding for implementing the program, and the requirement for Pennsylvania to develop a plan and strategy for implanting the program over the next five and 15 years.

SECTION II.

NPS Pollutant Loading Reductions and Water Quality Improvements

In an effort to better understand the impacts of Pa's nonpoint source restoration and remediation on removing impaired waters from Pa's Integrated List of All Waters, Pa. is including information in this Section that may be correlated with Section 319 NPS project implementation in specific watersheds or stream reaches.

Pa currently assesses its surface waters through the State Surface Water Assessment Program (SSWAP). A summary of SSWAP data as reported in Pa's 2004 Integrated List of All Waters follows:

Table 2. Statewide Surface Water Assessment Program

	Designated Use = Aquatic Life	
Streams	Miles	% of Total River and Stream Miles
Assessed	67,979	81.7
Supporting	57,217	68.8
Impaired	10,762	12.9
Lakes	Acres	% of Significant, Publicly owned Lakes
Assessed	75,543	76.3
Supporting	30,346	30.6
Impaired	45,197	45.6

Pa.'s water resources include 86,000 total miles of rivers and streams. This is a Pa DEP estimate based on 1:24,000 scale GIS stream coverage. Monitoring data indicates 84 percent of the assessed stream miles support the designated fish and aquatic life use. Impairment is reported in 16 percent of the assessed miles. The three largest sources of reported impairment are abandoned mine drainage, agriculture and urban runoff/storm sewers. The major causes of aquatic life use impairment in streams on a statewide basis are siltation, metals, nutrients and pH.

There are 98,942 acres of significant, publicly owned lakes in Pa. A total of 40 percent of the assessed lake acres support designated fish and aquatic life uses, while 60 percent have been assessed as impaired. The major sources of impairment in lakes are agriculture and "Other" sources. The "Other" Source code is often associated with low dissolved oxygen levels in the hypolimnion of naturally stratified lakes and is not caused by a pollutant. Additional sources of lake impairment are urban runoff/storm sewers and on-site wastewater. The primary causes of impairment are nutrients, pH, suspended solids and organic enrichment/low dissolved oxygen.

Part A. NPS Pollutant Load Reduction Summary

Pennsylvania load reduction data is obtained in several ways. Our recent, FFY2002 and later, grant agreements specify the need to report this information upon project implementation. For the majority of our Incremental projects, load reductions are applicable. There are two primary methods we use to document load reductions. They can be completed by (1) the project grantee and then provided to the Pa DEP project advisor, or (2) data provided by the project grantee to the PA DEP project advisor so that it can be used in an appropriate nonpoint source load reduction model. Examples of nonpoint source load reduction models that can be used for sediment and nutrient reduction estimates are the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) and the Region V Model. The latter was developed by the Michigan NPS program and is easily used for specific types of nonpoint source implementation projects. We use the Region V model on a limited basis. STEPL is used more frequently; it is more site-specific and requires more input data specific to the individual project(s). Project grantees are provided training and guidance for use of these models if they request it, and field data worksheets are reviewed with project grantees so that they understand the basic information being requested. This in turn helps the PA DEP project advisors. Both of the models mentioned are available to the public through the www.epa.gov website, and are recommended by the EPA to states for use with Section 319 Nonpoint Source project load reduction estimates.

Since 2002, the EPA has required states to report on both sediment and nutrient (nitrogen and phosphorus) reductions for Section 319 projects. The majority of project in Pa's FFY2002 through FFY2005 grants have documented either **Pre-implementation** or **Post-implementation** reductions. They are based on either water quality monitoring data in the case of abandoned mine drainage (AMD) or using Universal Soil Loss Equation (USLE), Revised Universal Soil Loss Equation (RUSLE), STEPL, or Region V model estimates for agricultural, hydro-modification, or other projects addressing nutrients and sediment.

Water quality monitoring data is available for some Urban Runoff/Stormwater NPS implementation projects. In many cases our Section 319 implementation projects are trying to reduce pollutant loads identified in TMDL in the watershed.

The Grants Reporting and Tracking System (GRTS) is used in Pennsylvania and other states to document nps pollutant load reduction estimates for Section 319 projects. The EPA requires this tracking tool be used. The GRTS is linked through the EPA WATERS network to other EPA-maintained databases and geographic information system (GIS) tools. Pennsylvania utilizes the Web-based Reach Indexing Tool (WebRIT) to track project geo-location. This tool uses the National Hydrography Dataset (NHD) stream reach index to link projects in Pennsylvania's GRTS database with specific stream reaches.

We are showing all NPS pollutant load reductions for projects with either Pre-implementation estimates or having project implementation partially or fully completed. Table 3 summarizes both nutrient and sediment load reduction estimates and AMD metals load reduction estimates for the FY2002 through FY2005 Section 319 grants.

Table 3. Load Reduction Estimates - FY2002 through FY2005

Federal Fiscal Year				
	Estimated Nutrient and Sediment Reductions			
		Nitrogen (pounds/year)	Phosphorus (pounds/year)	Sediment (tons/year)
2002		212,889	43,684	9,920
2003		39,476	10,707	10,232
2004		10,436	3,289	1,979
2005		12,365	5,806	6,269
	Totals:	275,166	63,486	28,400
	Estimated Metals Reductions			
		Aluminum (tons/year)	Iron (tons/year)	Other-Acidity (tons/year)
2002 (1)		22.4 lbs/yr	45.5 lbs/yr	0
2003		17.15	9.92	0
2004		153	10.66	1,322
2005		3.63	149.76	32.9
	Totals:	173.78	170.34	1,354.90

(1) Data is shown in pounds/year for 2002 only. All others are in tons/year.

This data was obtained from the EPA-State Grants Reporting and Tracking System (GRTS) database. Only current year load reduction estimates were used. Data includes both Pre- and Post-implementation estimates for all projects in the database (Source: January 27 and March 8, 2006 GRTS ad-hoc reports).

The data in Table 4 summarizes FY2003 Octoraro Creek Watershed Restoration-Phase II nutrient and sediment reductions for work completed October 2002 to September 2005. This was one of the more successful projects in terms of documenting reductions in pollutants to the watershed. Most of this information was obtained by using field data provided by the Chester and Lancaster County Conservation Districts and then using a load reduction model and not by actual surface water monitoring. Multiple sub-basins in both counties were targeted for BMPs. Many of the sub-basins are impaired by agricultural nonpoint sources.

Table 4. Octoraro Creek Watershed Load Reductions

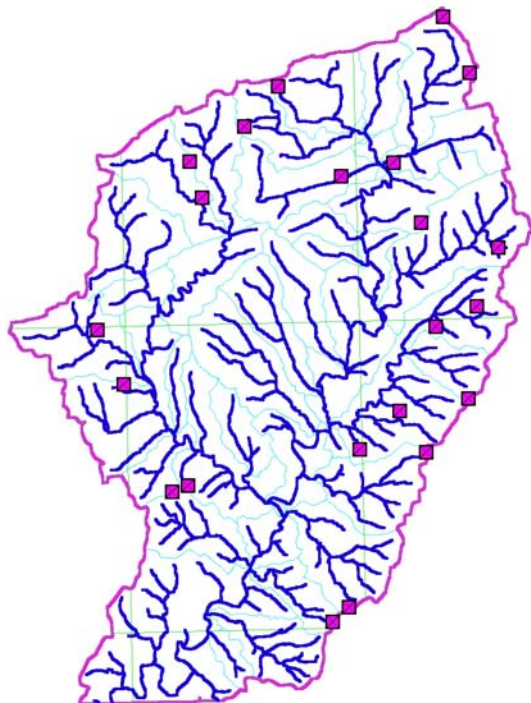
Location	Project types	Nitrogen (lbs/year)	Phosphorous (lbs/year)	Sediment (tons/year)
Chester County Multiple sub- basins	Multiple Projects and BMPs	7,765	1,829	304
Lancaster County Multiple sub- basins	Multiple Projects and BMPs	11,649	2,849	459
Totals:		19,412	4,678	763

Octoraro Phase II BMP Summary

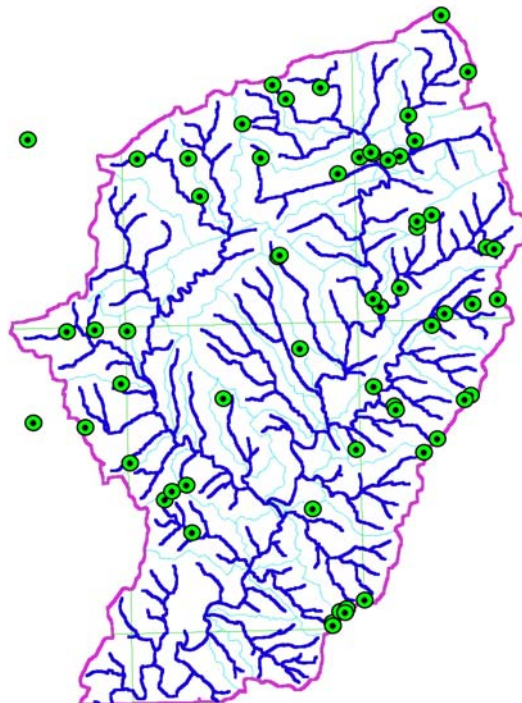
- Waterways Installation – **157 acres protected** & Waterways Installed – **8,075 feet**
- Terrace & Diversion Installation – **103 acres protected** & Terraces & Diversions Installed – **14,214 feet**
- Nutrient Management Plans with Waste Storage Structure Installation – **814 acres**
- Number of Barnyards Improved – **8**
- Streambank Stabilized – **1,270 feet**
- Forest Riparian Buffer planted – **0.5 acres**

Figure 1. Octoraro Creek Watershed Project Locations

The map on the left shows project locations for Octoraro Creek Phase II Restoration work. The map on the right shows the locations of all Octoraro Creek watershed restoration projects completed under both Phase I (project 2131) and Phase II (project 2328). The main stem of the Octoraro Creek runs from roughly southwest to northeast, separating Lancaster County on the west from Chester County on the east.



FY2003 project locations



FY2001 and FY2003 project locations

Pennsylvania Section 319 grants in FFY2001 and FFY2003 have installed agricultural and hydro-modification nonpoint source projects within the Octoraro Creek Watershed, Chester and Lancaster Counties. Red markers are locations of Octoraro Phase II projects completed under the FFY2003 Section 319 grant.

Part B. Delisting NPS Impaired Waters and Water Quality Improvements

According to EPA guidance provided to states on FY2005 Nonpoint Source (NPS) Annual Reports, the following information is required to be included. PA waters either partially or fully supporting uses in water bodies previously impaired by nonpoint sources of pollution are shown in Table 5.

Some of the aforementioned terms merit definitions:

Partially restored means impaired by >1 source, or for >1 use, and at least 1 or more (but not all) of these sources has been cleaned up or uses have been restored.

Fully restored means all sources of impairment have been cleaned up or restored, and designate uses are being achieved.

Water bodies are defined as any body of surface water as small as a stream segment.

Table 5. Fully restored waters since 2000 (cumulative)

Waterbody	Section 319 funds used	GRTS project number(s)	Impairment Source/ Cause	Year first listed on 303(d) list	State Waterbody ID	Segment Delisted
Manatawny (1) Creek (Berks, Montgomery County line)	Yes	003498000_44	Agriculture-Nutrients, Organic Enrichment/ Low D.O.	1996	PA03D01655	0-0.5863 0.5863-2.3562 2.3562-3.9389 3.9389-8.7667 8.7667-10.0992 10.0992-11.1338 11.1338-12.009 12.009-13.5946 13.5946-13.9374 13.9374-15.8023 15.8023-16.6422 16.6422-16.7137 16.7137-17.2256 17.2256-18.039 18.039-18.7813 18.7813-20.2993
UNT to (1) Manatawny Creek (Berks, Montgomery County line)	Yes	003498000_44	Hydromodification-Thermal Modification		PA03D01656	0-2.2708

Water quality in the following water bodies is believed to be improving. PA DEP staff at various meetings referred to improvements to these water bodies. The U.S. EPA and other organizations have written Success Stories for some of these water bodies. The streams listed in this table are not all listed in the 2004 Integrated List of All Waters as being impaired by nonpoint sources or needing a TMDL. As a case in point, the Mill Creek watershed in Bradford County is not included in Table 5., 2004 Integrated List, although a TMDL was approved by the EPA on 04/09/2001 for the Steven Foster Lake in the Mill Creek watershed. This lake is impaired by nutrients and sediment from agricultural sources.

Table 6. Water Quality Improvements

Waterbody	Section 319 funds used	GRTS project number(s)	Impairment Source/ Cause	Year first listed on 303(d) list	State Waterbody ID
Millers Run (Huntingdon County)	Yes	003498020_17 003498040_19 003498050_18 003498050_19 003498050_21	AMD	1996	
Longs Run (Bedford County)	Yes	003498040_20	AMD-Metals, pH	1996	PA11D13791
Lititz Run (Lancaster County)	Yes	003498980_21 003498990_60 003498030_26	Agriculture- Nutrients, Sediment Urban Runoff	2002 1996	PA07J07647 PA07J07646
Donegal Creek (Lancaster County)	Yes	003498970_15	Agriculture- Suspended Sediment	1996	PA07G07920
Mill Creek (Bradford County)	Yes	003498010_51	Agriculture- Nutrients, Suspended Sediment	1996	N/a
Slippery Rock Creek (Butler and Lawrence Counties)	Yes	003498970_18 003498980_13	AMD- Metals	All are 2004	PA20C34032 Multiple IDs
Glenwhite Run (Blair County)	Yes	003498990_15	AMD Metals AMD pH, Siltation AMD pH AMD Metals	1996 2002 2002 2004	PA11A16428 PA11A16429 PA11A16430 PA11A16431
Wells Creek (Somerset County)	Yes	003498030_22 003498030_23	AMD- Metals, pH	2002	PA18E45675-78, 92-99, 700-701

Part C. Number of watershed-based plans (and water miles/acres covered)

This corresponds to the number of Watershed-based plans supported under Pennsylvania's NPS Management Program since the beginning of FY 2002 that have been **substantially implemented** (cumulative).

Substantially implemented is interpreted as 100% of the actions geared towards remediation of the impairments in the watershed have been carried out.

Please note that Pa is only reporting the number of plans. Based on the EPA Grants Reporting and Tracking System (GRTS) project numbers listed, EPA will calculate the water miles/acres covered.

Table 7. Watershed-based Plans Substantially Implemented

Watershed-based Plan	Section 319 funds used	GRTS project number(s)	Substantially-implemented since last report?
None substantially implemented			

Pennsylvania claims no watershed-based plans to be fully or substantially implemented at this time. The EPA has accepted eight (8) watershed-based implementation plans to date; twelve (12) more plans are currently being prepared. The information in Table 8 and Table 9 are the interim measures that Pennsylvania will use for FY2005.

Table 8. Watershed-based Plans Completed and Accepted by EPA

Watershed Plan	Impairment Addressed	319 Grant Project Implementing Plan
Catawissa Creek (Schuylkill County)	AMD	003498990_17 003498040_17
Shoup Run (Huntingdon County)	AMD	003498020_17 003498040_19 003498050_18 003498050_19 003498050_21
Sandy Run/Long Run/Six-mile Run (Bedford County)	AMD	003498040_20 003498050_12 003498050_13
Core Creek/Lake Luxembourg (Bucks County)	Sediment, Nutrients	003498040_29
Bear Creek (Dauphin County)	AMD	003498040_18
Upper Schuylkill River (Schuylkill County)	AMD	003498020_15 003498030_21 003498040_16 003498040_21
Little Laurel Run (Cambria County)	AMD	003498050_15
Upper Kishacoquillas Creek (Mifflin County)	Sediment, Nutrients	003498020_24 003498020_28 003498050_26 003498050_27

Table 9. Watershed-based Plans Currently Being Prepared

Watershed Plan	Impairment Addressed	319 Grant Project Implementing Plan
Conewago Creek (Dauphin, Lancaster and Lebanon Counties)	Sediment, Nutrients	
Upper Swatara Creek (Schuylkill County)	AMD	003498050_14
Codorus Creek (York County)	Sediment, Nutrients	003498040_26 003498040_28 003498040_32 003498040_42
Anderson Creek (Clearfield County)	AMD	
Pine Run (Jefferson and Armstrong Counties)	AMD	003498050_23
Hubler Run (Clearfield County)	AMD	003498050_17
Johnson Creek (Tioga County)	AMD	003498050_16
Mill Creek (Lancaster County)	Sediment, Nutrients	003498050_28 003498050_29
Black's Creek (Butler County)	AMD	003498050_24
Harvey's Lake (Luzerne County)	Sediment, Nutrients	003498050_36
Conowingo Creek (Lancaster County)	Sediment, Nutrients	
Montgomery Creek (Clearfield County)	AMD	

SECTION III.

Input from Non-point Source workgroups

The individual NPS program area milestones (abbreviated) (pp. 11-43, Section I, 1999 Update NPS Management Program, September 1999) and accomplishments over the past year (October 2004 through September 2005) are shown in the following NPS Workgroup summaries.

Agriculture Workgroup

Milestone A. Half of all concentrated animal operations (CAO) will have nutrient management plans (NMP) developed.

Completed.

- USDA Conservation Innovation Grants and Growing Greener Initiative moneys are being used for Livestock and Poultry Feed Ration projects in Pennsylvania; Precision Dairy Feeding to Reduce Nutrient Pollution in Pennsylvania's Waters and the Chesapeake Bay, The Pennsylvania State University, CBF and University of Pa. with funding from USDA-Conservation Innovation Grant, Growing Greener and CBF.
- Poultry feed rations are being adjusted to reduce phosphorus excreted in waste. P-Index in Nutrient Management Regulations has been adjusted to allow more flexibility for poultry operations in short term
- USDA Technical Service Providers have the ability to prepare nutrient management plans, which are reviewed and approved by conservation district qualified staff.
- Growing Greener Initiative, Energy Harvest Grant, and EQIP have funded manure digesters as an alternative use of excess manure.

Milestone B. Existing CAOs over 1,000 animal equivalent units (AEU) with manure storage facilities will have manure discharge potential assessed.

Completed.

Milestone C. BMP Installation to reduce NPS impacts and estimation of pollutant loadings by 2015.

Ongoing.

- Chesapeake Bay Tributary Strategy Implementation Plans have been developed and are being implemented. Agricultural BMP focus is on low-cost and high-return practices such as No-Till, Cover Cropping, Precision Nutrient Management, and riparian buffer implementation.
- Intensive and rotational grazing practices are gaining widespread acceptance. The Chesapeake Bay Tributary Strategy and county implementation plans are including grazing practices as a cost effective nutrient management tool; Project Grass Chapters throughout Pa. are utilizing state and federal funding to install grazing plans for livestock farmers. Growing

Greener Initiative awarded over \$400,000 for grazing practices to South-central and Southwestern Pa Project Grass Chapters in late 2005.

Milestone D. Increase written conservation plans by 4% annually from 1999 baseline number of conservation plans written and being implemented.

Completed.

- CBP funds for Conservation Planning, e.g. Toolkit use by conservation districts, are being provided. Conservation Planning Boot Camp is being planned for 2006. NRCS Technical Service Providers help with Conservation Plan development, with conservation districts reviewing and certifying plans.

Milestone E. Implement 25 miles of riparian buffers annually to minimize nutrient and sediment impacts to streams.

Completed.

- Alternative riparian buffer designs are being incorporated into grazing projects where pastures are adjacent to streams; A pilot project in south-central counties is using the NRCS Filter Strip Practice 393 to provide for woody buffers adjacent to streams and herbaceous buffers between that and pasture areas.
- Riparian buffer funding sources information has been disseminated through DEP Watershed Academies, Forest Buffer Toolkit revisions, and Pa. Ag Progress Days demonstrations.

Milestone F. Implement the Conservation Reserve Enhancement Program (CREP).

- The USDA approved a \$200 million expansion for the Ohio River basin.
- The 2002 Farm Bill authorizes CREP through 2007. There is currently no action for expanding CREP to include the Delaware River basin. Approximately 148,000 acres of the original 250,00 Goal has been met in the Susquehanna River CREP counties (Source: October 2005 CREP Watershed Academy).

Table 10. FY2005 Conservation Reserve Enhancement Program

River Basin	Year	Total Acres Contracted	Riparian Buffer Acres Contracted / % of Total
Susquehanna River			
	2005	34,538	2,855 / 8.3
	Cumulative	147,033	13,772 / 9.4
Ohio River			
	2005	5,691	311 / 5.5
	Cumulative	9,124	

Milestone G. Implement 10 miles of stream bank fencing in pasture lands annually.

Exceeded.

- Stream bank fencing with riparian buffers in pasturelands is being implemented statewide. Growing Greener Initiative funds and county conservation district assistance have helped many producers install fencing. See Milestone E.

Milestone H. Increase agriculture program Technical Assistance staff by 25% by 2004.

Exceeded.

- There are currently 45 Agriculture Conservation Technicians (ACT) in 45 counties; 41.5 Nutrient Management Act Technician FTE positions (providing services directly related to Pa's Nutrient Management Act) and 41 Chesapeake Bay Program technicians employed at the local level. This number has increased substantially from 1999 levels.
- The number of counties participating in the Pa Department of Agriculture's ChemSweep Program continues to increase. PDA Regional Inspection staff select from one to three counties per Region per year to participate; Seventeen counties are currently participating in the program. ChemSweep is currently in the third swing through Pennsylvania.

Milestone I. Educate the agriculture community on dead animal disposal and composting.

- The Tioga County Office of the Penn State Cooperative Extension continues to take the lead with education and for the agricultural community. Tioga County project goals are to: Build compost demonstrations; improve present systems; Reduce Rendering Costs; Reduce Potential Neighbor Problems. The Pa Department of Agriculture Act 100, and Pa NRCS Practice Code 318 Poultry and Livestock Composting Facilities, govern uses and facility construction.
- The Penn State College of Agricultural Sciences includes information on the website <http://composting.cas.psu.edu>.

Milestone J. Train local staff to implement NPS programs by 2004.

- Increased funding for conservation districts and local organizations has been provided through the Environmental Stewardship and Watershed Protection Act (Growing Greener I and II), and Section 319(h) of the Federal Clean Water Act.
- The Pa No-Till Alliance was formed in 2004-2005.
- Trainings and Boot Camps are held for No-Till, Chesapeake Bay, Coastal NPS, Conservation Planning, Nutrient Management Planning, and other programs.
- Funding for BMPs in Special Protection watersheds is provided through the Growing Greener Initiative and Section 319 NPS program's Watershed Protection effort.

Milestone K. New funding sources for agricultural NPS through 2004.

- A delivery system has been implemented for Pa's Growing Greener Initiative. Funds have been allocated to projects from 2000 to present.
- AGRI-LINK is implemented and being utilized by producers seeking low interest loans to install conservation practices.
- Legislation and new initiatives are in place. The Agricultural Community and Rural Environment (ACRE) legislation was passed in July 2005; it incorporated the Act 6 of 1993 Nutrient Management Act legislation. A pilot program under ACRE provides counties grants for Ag Erosion and Sediment Control.
- The USDA Conservation Innovation Grant program has funded seven projects in Pa. in 2004 and 2005. NFWF funds are used in Chesapeake Bay watershed. WREN and PACD mini-grants via CBP and S. 319 NPS programs are available to local organizations. The CBP funds new practices identified in County Tributary Strategy Plans.
- USDA CREP expansion to the Ohio River basin; established a 65,000 acre target.
- The USDA-NRCS Conservation Security Program (CSP) has targeted implementation in one-eighth of Pa's watersheds over the next 8 years, pending federal funding.
- Summary of Pa. CSP: Year 1 (2003) 1 watershed; Year 2 (2004) 3 watersheds; Year 3 (2005) 2 watersheds approved. The Raystown/Juniata River CSP watershed (Year 1) has 42 producer contracts now. Table 11 gives the status of CSP in Pa.

Table 11. 2005 Pa. Conservation Security Program

Watershed	Year Initiated	Total CSP Applications Approved
Raystown Branch of Juniata River	2003	12
Chester-Sassafras River	2004	6
Lower Susquehanna River-Swatara Creek	2004	127
Schuylkill River	2004	85
Monocacy River	2005	Signups underway
French Creek	2005	Signups underway
Total Contracts		230

Milestone L. Increase education, outreach, technology transfer through 2004.

Exceeded.

- GG I, GG II, Section 319 NPS Implementation, USDA, and Penn State C.E., many other organizations.
- Pennsylvania's Agriculture, Communities and Rural Environment (ACRE) legislation was passed in July 2005. Act 38 of 2005 addresses illegal ordinances and odor control on livestock operations. The website <http://agenvpolicy.aers.psu.edu/> for the Penn State University Nutrient Management Program includes information on the ACRE initiative.

Resource Extraction Workgroup

Accomplishments

Milestone A. New watershed plans that incorporate prevention and remediation of pollution from resource extraction activities.

- Thirteen plans have been started and either completed or close to completion.
- During 2005, seven restoration plans or additions to plans were funded to update plans to meet EPA's Watershed Implementation Plan criteria for incremental 319 funding.
- The DEP District Mining offices and consultants continue to develop TMDLs for streams impaired by abandoned mine drainage and on the 303d list. See section on TMDLs for a list of watersheds with TMDLs under development.

Milestone B. Continue monitoring passive treatment systems after construction.

Swatara Creek

- The NMP on Swatara Creek has been extended through 2007 to continue to document results of treatment systems. Fish and macroinvertebrates are sampled in October; water chemistry sampling is conducted year-round. Sampling of the Swatara Creek watershed by the USGS, funded through the 319 National Monitoring program (NMP), had documented improvements in both water quality and the number of fish species in Swatara Creek at Good Spring Creek, Lorberry Creek and at Ravine, the downstream end of the coal mined area after installation of passive treatment systems and land reclamation.

Upper Schuylkill River

- Sampling and monitoring of 319 funded projects at the Otto discharge on Muddy Run in the upper Schuylkill River watershed continued in the pre-construction phase. Fish and macroinvertebrates were sampled in October; water chemistry sampling was conducted quarterly, year-round by USGS.
- Sampling and monitoring of 319 funded projects on the Reevesdale Dip Tunnel and Pine Forest Discharge began in June 2005. Monitoring will be conducted upstream and downstream from the discharges and at the inflow, outflow, and intermediate points within

the treatment systems. Water quality and flow will be sampled at the selected sites until September 2006.

Blacklick Creek

- The Cambria District Mine office and members of the Blacklick Creek Watershed Association have been monitoring projects in the Coal Pit Run and Lower Yellow Creek areas of Blacklick Creek. The first project was a systems modification to a passive treatment system in the lower Yellow Creek Watershed. Due to mining, changes in flow affected the treatment capabilities. The second project being monitored is a passive treatment system in the Coal Pit Run watershed. Flow and water quality are being measured to track the success of the project.

Broad Top Coal Field

- Broad Top Township is monitoring the environmental results of the treatment systems installed in their township on Longs Run, Sandy Run and Six Mile Run. The Cambria District Mine Office of DEP has assisted them in their monitoring.
- Shoup Run Watershed Association and Cambria DMO continue monitoring of Shoup Run watershed to assess the results of treatment systems installed in the watershed.

Catawissa Creek

- Monitoring in the Catawissa Creek watershed was continued in 2005 as construction for the Audenreid Tunnel passive treatment system began. Water chemistry sampling is conducted year-round by the DEP-BAMR Wilkes Barre Office and field tested by the Catawissa Creek Restoration Association. Additional sites farther downstream will be sampled by SRBC in conjunction with their macroinvertebrate sampling.

WPCAMR

- WPCAMR is in the process of constructing a comprehensive O&M data management system to keep track of all relevant data for passive treatment systems in PA. Included with that is a "early warning system" which will help predict if a treatment system is in decline, hopefully well before failure. The program will also assist watershed groups with the costs of laboratory chemical analyses of system water samples.

EPCAMR

- EPCAMR developed a tool to show abandoned mine land reclamation using Arc GIS 9.1 Arc Info Software through a Memorandum of Understanding with the Office of Surface Mining. The PA DEP Bureau of Abandoned Mine Reclamation (BAMR) Database was combined with the Abandoned Mine Land Information System (AMLIS) Database to create both a state wide and a case-by-case view of the current status of Abandoned Mine Reclamation by PA DEP BAMR. EPCAMR, DEP District Mining Offices, WPCAMR and the Western PA Watershed Program will be collecting more information to include reclamation done by other entities.

OSM

- During 2004 & 2005 OSM developed an AMD passive treatment system database, "Pennsylvania AML-AMD Passive Treatment Projects". There are over 200 individual

projects in the database. The database is maintained by OSM. The database was developed in cooperation with DEP DMO, BAMR and WPCAMR. EPCAMR was also involved in the development of the OSM Treatment System Database. The number of sites identified is 279 with more to be added. It also contains water quality data which will help determine load reductions in the treatment systems.

Milestone C. Implementation of restoration of plans to abate pollution from resource extraction activities.

- During 2005 three Chesapeake Bay Small Watershed Grants Projects were awarded for AMD projects.
- Thirteen Growing Greener Grants were awarded for AMD treatment/restoration.
- Projects funded by Section 319 grants were awarded to fund ten AMD projects.
- Implementation continues in six watersheds focused on AMD treatment /restoration.

AMD Treatment Systems Completed during 2005:

Construction of the Permapress Discharge treatment system was completed in Spring 2005. The treatment system is located in the Indian Creek Watershed, Springfield Township, Fayette County. The Mountain Watershed Association received funding through USDA-NRCS and OSM for the construction of the system. The Permapress Discharge flows from a reclaimed strip mine at a rate of 20-35 GPM into an unnamed tributary to Indian Creek. The average acidity is 150 mg/l and the average aluminum concentration is 23 mg/l. The passive treatment system consists of a vertical flow limestone pond with a bell siphon automatic flushing system and a settling basin to settle out the aluminum precipitate.

Construction of the Keystone State Park AMD treatment system was completed in Fall 2004. The treatment system is located in the Loyalhanna Creek Watershed, Derry Township, Westmoreland County. Construction of the system was funded by the PA DEP BAMR 10% set-aside program. The discharge is from an abandoned deep mine located adjacent to Keystone State Park Lake. The discharge, which flows into McCune Run, has an average flow of 57 GPM and an average pH of 3.5. The average concentrations of iron, manganese, aluminum, and acidity are 23 mg/l, 5 mg/l, 8 mg/l, and 140 mg/l, respectively. The passive treatment system consists of a limestone upflow pond, an aerobic wetland pond and a flushing pond.

Construction of the Boggs Road Mine Drainage treatment system was completed in Summer 2005. The treatment system is located in the Montour Run Watershed, Findlay Township, Allegheny County. The Montour Run Watershed Association received Growing Greener funding and Title IV OSM Cooperative Agreement funding in 2003 for the construction of the system. The Boggs Road Discharge, which emanates from an abandoned surface mine, is alkaline with high iron and manganese concentrations. The passive treatment system includes a forebay and an aerobic wetland complex consisting of bioswales, settling ponds, and wetlands.

The system is preventing about 8,000 to 10,000 pounds of metals annually from entering South Fork Montour Run.

Coal Pit Run AMD Abatement Project was completed this year with 319 funding. The project was built to treat a deep mine discharge with average flow of 40-50 gpm with low pH and high concentrations of iron and aluminum. A Sulfate Reducing Bioreactor was installed to treat the discharge.

The construction of an Innovative Aerobic Treatment System for the Otto Discharge was completed in 2005 with 319 funding. The Otto Colliery Airshaft discharge near Branchdale, Schuylkill County is one of the largest discharges in the Schuylkill River. The system consists of an oxidation pond with hydraulic aeration to facilitate the oxidation of dissolved iron, two wetland ponds to precipitate iron-hydroxide particles and an oxic limestone drain that will promote the removal of manganese and trace metals, add alkalinity and maintain the cold-water temperature for the trout.

Construction of the Audenreid Mine Tunnel Discharge was completed in December 2005 in the Catawissa Creek Watershed in Schuylkill County, Pennsylvania. The Audenreid Mine Tunnel Discharge is the largest abandoned mine drainage (AMD) discharge within the Catawissa Creek Watershed. The system is treating over 8000 gpm of mine water that is polluted with dissolved aluminum and acidity. The mine water is collected and separated into three 120 ft diameter, 10 ft deep concrete tanks that are each filled with approximately 4,500 tons of high grade limestone. The treatment system is expected to allow Catawissa Creek to meet total maximum daily load requirements by reducing 21% of the iron, 73% of the manganese, 95% of the aluminum, and 99% of the acidity from the Audenreid Mine Tunnel discharge. Preliminary results indicate acid neutralizing capacity increased almost three times that of what it was before treatment and pH increased by approximately 30%. The Schuylkill Conservation District, in partnership with the Catawissa Creek Restoration Association, and EPCAMR received nearly 2 million dollars in grants to construct this project, the largest funding source being \$1.4 Million from the 319 Program. Other sources include the USDA-NRCS, OSM, PA DEP BAMR for the construction of the system.

Two projects were completed in the Kettle Creek Watershed. In Two Mile Run over 50 acres of abandoned mine lands was regarded. Also the Huling Branch AMD Collection System Project was completed. This project was the installation of a collection system to bring all the water from a deep mine discharge together so it can be monitored more effectively for both quality and quantity.

Two projects were completed in the Babb Creek Watershed. The Mitchell Treatment System collects water from 2 different discharges. A pipeline was built to the treatment facility. There a splitter box was installed that has the capabilities to split the water into four different systems. For now only one system is installed. It consists of one limestone tank that is then hooked to a self-flushing siphon to a settling pond. More monitoring is to be completed on Babb's Creek. If this system works and the water sampling shows that more treatment is needed there is room to build more limestone tanks. Another project completed was on the Arnot SAPS ALD replacement project. In this project limestone was replaced and the plumbing was rebuilt.

BAMR Completed Projects

- Clover Run, Jefferson County – The Clover #1 Project was the construction of an AMD Collection System and Pond that improved 2 miles of stream.
- Pegrin Run, Cambria County – The South Nanty Glo #1 (Webster) project was the construction of two vertical flow reactors and aerobic wetland which improved 5 miles of stream.
- McCune Run, Westmoreland County – The Keystone Phase II Project was the construction of 1 LUP, 1 pond and 1 aerobic wetland that improved 1.2 miles.
- Little Mill Creek, Jefferson county – The REM Passive treatment Site Project was construction of 1 anoxic limestone drain, 4 vertical flow reactors and 8 settling ponds.
- Little Scrubgrass Creek, Butler county – The Pengrove Coal Company Project was the construction of 1 SRBR.
- West Branch Susquehanna River, Cambria County – The Barnes Tucker Phase 1 Project was the removal of refuse and reclamation of the site.

Milestone D. Develop innovative technology or refine existing technology to prevent or treat degradation from resource extraction activities.

Hedin Environmental continues to pursue new avenues for the iron sludge that accumulates in passive treatment systems. Hedin has a company, Iron Oxide Recovery, Inc., focusing on the pollutants extracted from mine drainage during the treatment process. The goal is to help allow treatment systems to pay for themselves and eventually provide waste free treatment. Iron oxide is used as pigment in a number of products, including paint.

In the fall of 2004 construction began on Lowber Passive Treatment System in Westmoreland County. This system was designed specifically to produce a marketable iron product from mine drainage. The system is expected to produce over 200 tons per year of iron solids and prevent them from polluting Sewickly Creek.

In 2002 Saint Vincent College was awarded a Growing Greener Grant for a project entitled, "AMD Treatment Using Activated Iron Sludge". The goal of the project was to demonstrate the effective use of a new and innovative Activated Iron Sludge (AIS) Process to treat the Lower Saxman Run Discharge near Latrobe, Westmoreland County. The AIS process was investigated using a 10,000-gallon Sequencing Batch Reactor. Iron oxide solids produced by the AIS process are capable of producing a high-density sludge that quickly dewater and obtains a density of 30% solids on a weight basis. The elemental analysis has shown that the dry solids are 96% pure iron oxide. The project has shown that the AIS process is capable of efficiently and economically treating AMD. The project was completed in June 2005.

In 2004-2005 BAMR requested proposals for innovative in-situ or ex-situ mine drainage treatment or abatement or enhanced metals recovery. Seven are to be awarded and are as follows:

Innovative Enhanced Metals Recovery from Acid Mine Drainage - Concurrent Technologies Corporation and R.J. Lee Group, Inc - Bobtown Greene County

This proposal is a two-phased enhanced metals recovery program using iron derived from Pa. AMD as a raw material to produce a novel corrosion inhibitor. The first phase includes identifying methods to handle and transport AMD sludge materials in an economically efficient manner through a series of pilot testing to select the most efficient dewatering equipment; optimizing polymer additives, pyroprocessing dewatered AMD sludge in a rotary kiln, and testing dewatered sludge with a cement manufacturer. Phase 2 (funding not included in price of this proposal) would be the design and construction of a full scale manufacturing plant. The staff at RJ Lee has developed the process in the lab and has successfully tested the ability to the material to work as functioned. RJ Lee has also met with high-level officials of both PennDOT and the Pa. Turnpike Commission to seek cooperation of a test pave. A full-scale operation would use about 82,000 tons of AMD sludge on an annual basis.

Feasibility for Use of Fe/Ca Acid Mine Drainage Residual in the Powdered Metals Industry – North Central Pa. Regional Planning & Development Commission and St. Mary’s Pressed Metals - St. Mary’s Pressed Metals Ridgway, Elk County

It has already been demonstrated that the sludge from the Brandy Camp treatment plant can be used by the powdered metal industry to make bearings and bushings. There is significant potential for the sludge to be used as a feedstock for this industry. However, more testing and work needs to be completed by the PM industry to establish a standardized procedure to get this material into the production line on a continual basis. This project would:

- Determine the feasibility of use of the sludge for use in manufacturing P/M components
- Determine characteristics of the metal
- Determine alternative uses
- Complete a cost-benefit analysis
- Explore nanostructure characteristics
- Determine further processing techniques
- Develop a commercialization plan

Nutrient and Metals Removal Using Iron Oxide Solids From Acidic Mine Drainage Treatment: A Market-Based Pollution Solution Approach - Saint Vincent College and Iron Oxide Technologies, LLC - Unity Township Municipal Authority

This proposal tests the ability of iron oxide sludges to compete with Ferric Chloride and Alum as a medium for removing phosphorous from municipal wastewater treatment plants. This will be a full-scale test. The proposal will also test the ability of these sludges to sequester heavy metals, i.e. lead, copper, zinc, etc., from industrial wastewater and compare costs to ion exchange or reverse osmosis. This will be a bench scale test.

Manganese Resource Recovery - Stream Restoration, Inc. - DeSalle Phase 2, Venango Township, Butler County and Erico Bridge Restoration Area, Venango Township, Butler County

On the resource recovery side of the picture, manganese recovery and resale has gotten little attention. However, manganese can be removed from mine drainage through passive treatment systems. This proposal plans to (1) evaluate the recovery process and costs, (2) determine the consistency of the raw material, (3) pilot scale processing of recovered material, (4) identify product demand, and (5) identify future design improvements to decrease operation, maintenance and implementation. The pottery industry uses high-grade manganese in glaze recipes with a retail value of \$1.20 to \$3.00 per pound. Manganese is not currently produced commercially in the United States. There are many sites, especially in northwestern Pennsylvania with high manganese concentrations in their post mining discharges. The potential for recovery of manganese from these sites is in the neighborhood of hundreds to thousands of tons per year.

Innovative Ex-Situ Activated Iron Solids Treatment & Enhanced Iron Oxide Recovery From Various Types of High Flow Acidic Mine Drainage - Western Pennsylvania Coalition for Abandoned Mine Reclamation and Iron Oxide Technologies, LLC - S.W. Borehole, Solomon Creek, Wilkes-Barre, Lackawanna County; Excelsior Mine Discharge Shamokin, Northumberland County; Hayes Run Discharge, Brockway, Jefferson County; Phillips Mine Discharge, Uniontown, Fayette County; Saxman Run Latrobe, Westmoreland County

Dr. Jon Dietz developed an Activated Iron Solids (AIS)/ Sequencing Batch Reactor (SBR) to economically treat AMD containing high concentrations of ferrous iron, currently being demonstrated on the Saxman Run discharge near Latrobe. This study proposes five pilot scale demonstrations at different locations treating a variety of AMD chemistries. The AIS minimizes chemical needs (and costs) by recirculating iron in the mixing chamber. A typical AMD treatment plant using lime produces a sludge containing only about 4% solids and many impurities. The sludge produced by the AIS ranges from 20 to 30% solids with purity exceeding 95%. Sludge handling and disposal is a major cost associated with AMD treatment plants. The denser sludge will reduce sludge handling and disposal costs and the high purity will lend itself to finding a market for the sludge. Successful pilot scale studies will provide Dr. Dietz with the information needed to scale up the unit to handle much larger flows (such as we will be treating at Hollywood) and serve as a full scale AMD treatment plant.

In-Situ Treatment of Abandoned Mine Drainage Utilizing Indigenous Bacteria in a Reduced Environment - Western Pennsylvania Coalition for Abandoned Mine Reclamation and Winner Energy and Environmental Services, LLC - Various mine discharges in Western PA

Sulfate reducing bacteria have demonstrated the ability to neutralize acid mine drainage, generating significant alkalinity and reducing SO₄ concentrations. However, in order to perform this task, the bacteria require a source of carbon, such as alcohols or sugars, for fuel. This proposal plans to sample the several mines in the bituminous region to isolate the indigenous bacteria. BioRemedial will study the bacteria in their laboratory and provide them with several

carbon sources to determine which products produce the greatest SRB activity. They will focus on waste stream products.

Optimizing the Design and Operation of Self-Flushing Limestone Systems for Mine Drainage Treatment - Western Pennsylvania Coalition for Abandoned Mine Reclamation and Hedin Environmental - Henry Run, Farmington Township, Clarion County and Bear Creek, Allegheny Township, Butler County

Until recently, the standard for passive treatment of AMD was a vertical flow wetland (VFW) that utilized compost over a layer of limestone. These systems seldom functioned according to theory. Based on observations of failures, a simpler system, the limestone upflow pond with automatic siphon discharge, emerged to overcome many of the operation and maintenance issues associated with the VFW's. Several of the self-flushing, limestone-only systems have been built and are showing great promise in being an effective treatment unit while greatly minimizing O&M requirements. However, it is now time to examine these systems in detail to determine how to optimize their performance. This proposal will do that. Existing systems will be monitored and small-scale systems will be built where the variables can be altered to determine optimum design factors.

In 2004 –2005 BAMR requested proposals for industrial or economic development utilizing mine pool waters. The one that will be awarded is as follows:

Construction of a Water Treatment Plant at the Green Mountain Tunnel Discharge to Provide Potable Water to Humboldt Industrial Park - CANDU, Inc and GTS Technologies, Inc. - Green Mountain Tunnel Discharge, Humboldt Industrial Park Union Township, Schuylkill County

CANDU proposes to build a water treatment plant to treat the one mgd from the Green Mountain Tunnel and sell the water to the Humboldt Industrial Park. The industrial park is in need of an additional one mgd of water to allow for expansion and the potential creation of 4,800 jobs. GTS Technologies would design the plant and Butler Enterprises would own and operate it. The Green Mountain Tunnel discharges into the Catawissa Creek, the site of the Audenreid Tunnel discharge project presently under construction. Having this discharge treated will result in a significant improvement in Catawissa Creek.

Milestone E. Promote innovative policies and procedures to prevent degradation from future resource extraction activities.

West Branch Susquehanna River Task Force

As result of a growing interest in the West Branch of the Susquehanna by both the Governor with PA Wilds and National Trout Unlimited, PA Department of Environmental Protection (DEP) Secretary Kathleen A. McGinty created the West Branch Susquehanna River Task Force, charging it with the responsibility of assisting and advising DEP and its partners in the AMD restoration effort in the region.

The Task Force, which held its initial meeting on September 10, 2004, is composed of state and federal agencies, conservation organizations and other entities concerned with the restoration of the West Branch Susquehanna River.

Also as the result of the West Branch Restoration Symposium a group of local citizens formed a steering committee to help educate and build widespread public support for the West Branch Watershed Initiative. They have met several times since the symposium. They will be the link between the public and the West Branch Task Force. They believe the immediate priority is to prepare an assessment of the AMD problems in the watershed. This should coincide nicely with the TMDL study being completed by SRBC on the West Branch of the Susquehanna.

Schuylkill Action Network (SAN), Acid Mine Drainage Workgroup

The Schuylkill Action Network (SAN) continues to focus on drinking water quality issues of the Schuylkill River Watershed, which covers parts of 11 counties in southeastern Pennsylvania. The Schuylkill River has 52 drinking water intakes, provides water for thermoelectric generation, and offers fishing and recreational opportunities.

"The purpose of the SAN is to improve the water resources of the Schuylkill River watershed by working in partnership with state agencies, local watershed organizations, water suppliers, local governments, and the Federal government to transcend regulatory and jurisdictional boundaries in the implementation of protection measures."

Description, Goals and Participants

Members of the AMD workgroup include Environmental Protection Agency Region III, Pennsylvania Department of Environmental Protection Bureau of Abandoned Mine Reclamation, Bureau of Watershed Management, and Pottsville District Mine Office, Philadelphia Water Department, Schuylkill Headwaters Association, Schuylkill County Conservation District, Army Corps of Engineers, US Geological Survey, PECO Exelon, Reading Anthracite, and the Eastern PA Coalition for Abandoned Mine Reclamation

The Acid Mine Drainage (AMD) Workgroup meets regularly to discuss treatment options in the watershed. The workgroup is moving forward on several fronts for remediating the Pine Knot Tunnel discharge. Discussions at meetings included monitoring protocol for providing measures of success and for coordinating with other SAN workgroups; analyzing field survey results to identify strip pits recommended for filling and streams suggested for daylighting (bringing to the surface); and grant applications and funding sources for monitoring and remediation activity.

Milestone G. Funding sources.

In this time of budgetary crunches on both the federal and state levels, the news was not good in 2005 for funding of projects to remediate damage from abandoned mining. The Office of Surface Mining's (OSM) Application Clean Stream Initiative has a program called the Watershed Cooperative Agreement Program (WCAP) provides supplemental funding for construction of acid mine drainage (AMD) reclamation projects in Appalachian states. This is a relatively small federal program that provided a much-needed boost in funding projects. In Pennsylvania,

WCAP has provided over \$4.9 million in assistance for 51 projects; the usual funding award is \$100,000 per project. In the entire Appalachian region, 96 awards to 44 watershed groups totaling \$8.6 million were made since the beginning of this program in 1988. This funding often makes the difference in whether a project is built or not. The program also delivers technical assistance to watershed groups.

- A number of groups (the AML Campaign, which includes WPCAMR and EPCAMR) have been working together towards the reauthorization of Title IV of SMCRA. The program was extended but is due to expire June 30, 2006

The House in February 2005 passed an \$880 million bond known as Growing Greener II and in April the Senate amended it to \$625 million. In May 2005, Pennsylvanians voted to approve the \$625 billion bond issue and Growing Greener II was passed. This funding will be used to protect farmlands, preserve natural areas and open spaces, clean up polluted streams and reclaim abandoned mine lands, and improve state and community parks and fish and wildlife infrastructure. This program will also invest in community revitalization and promote the use of clean energy.

Funding through the Clean Water Act, Section 319 was reduced in FFY 2006. Pennsylvania's funding allotment for FFY2006 through Section 319 of the Federal Clean Water Act is \$5,900,100. Of that amount, more than \$1.75 million is earmarked for addressing Abandoned Mine Drainage concerns.

A new funding source for emergency repairs on Growing Greener Projects was awarded to WPCAMR. This "Quick Response" program will make funding available immediately for eligible projects when failure in a project is going to cause immediate damage to the receiving stream. WPCAMR also continues to administer a grant that pays for water sampling on passive treatment systems.

Milestone I. Public awareness activities on non-point source pollution from resource extraction and effects of remediation activities.

The seventh annual conference on abandoned mine drainage and reclamation was held at the Pittsburgh. The 2005 Mine Water treatment Conference hosted in part by OSM, WPCAMR and EPCAMR, was a big success in bringing experts from across the US and a few other countries. The conference brought together watershed associations, environmental organizations, consulting firms, government agencies, and other partners in abandoned mine reclamation to share new technologies and ideas and to form new partnerships.

The 2006 conference is still in its planning stages. The theme will be "Back to the Basics" and it will have many different topics for attendees to learn about AMD and other water quality issues

Websites developed by EPCAMR & WPCAMR have been enhanced and updated. The sites provide valuable information for the public on all aspects of abandoned mine drainage, sources of funding, solutions to AMD problems, treatment options, planning, and links to many other

websites. The site addresses for WPCAMR is <http://amrclearinghouse.org/>. The EPCAMR website is <http://www.orangewaternetwork.org>.

- WPCAMR continued to use their email subscription service called, “**Abandoned Mine Posts**”, a free e-mail subscription service with information related to abandoned mine reclamation in Pennsylvania. Subscribers receive periodic articles and notices via e-mail that inform them about a variety of topics and current events related to abandoned mine drainage and reclamation.

WPCAMR and EPCAMR aided in the production of a video by Penn State. It was a show about PA’s water resources that included mining impacts and has been produced and aired on TV.

WPCAMR has completed digitizing and placed on the web 79 Operation Scarlift reports from the 1970's packed with useful information from mining impacted areas and acid mine discharges. WPCAMR's website, www.AMRClearinghouse.org receives over quarter of a million hits annually and contains almost 2 Gigabytes of information related to AMD/AMR. EPCAMR has begun to convert mine pool maps from the Anthracite Region Operation Scarlift Reports into GIS Format to increase their usefulness when estimating volumes of mine pool water and to aide in understanding mine pool dynamics.

WPCAMR has a new program called AMD 101, which teaches the formation of AMD from a chemistry standpoint. WPCAMR was a sponsor in Passing Go, a series of programs helping watershed groups become more self-sufficient.

EPCAMR has borrowed from WPCAMR and enhanced a very productive program for AMD/AML impacted municipalities called "AMD in Your Community". The program has been presented to about 10 municipalities in 2005 and will continue in 2006. EPCAMR also conducted at least 12 informative presentations on AMD/AML Issues and approximately 5 AMD/AML focused watershed tours in 2005.

WPCAMR and EPCAMR helped in publicizing the Growing Greener II voter referendum last year. A number of groups (the AML Campaign, which includes WPCAMR and EPCMAR) have put in a great deal of time and effort in efforts to get SMCRA Title IV revamped and the fees reauthorized.

The 12th Annual Monastery Run Project Symposium was held at St. Vincent College in Latrobe in November 2004. The theme was “The System Showdown” which gave various watershed groups a chance to “show off” what they have accomplished. Two afternoon field trips were offered to the Keystone State Park Acid Mine Drainage Remediation Site and the Latrobe Foundation Property Project.

There was a West Branch Susquehanna Symposium held in May 2005 in State College. The Symposium was a result of the West Branch Susquehanna Watershed Initiative to clean up this river. Speakers from various agencies and groups spoke on the condition of the West Branch and its tributaries and what remediation efforts are occurring

Construction And Urban Runoff Workgroup Accomplishments

Milestone A. Annual Report on Chapter 102/105 program activities which indicates that effective best management practices to minimize accelerated erosion and prevent sediment pollution are being implemented for earthmoving activities. The report summarizes agency and conservation district accomplishments including plan review, technical assistance, permitting, compliance and enforcement activities, program hour/costs and inspections.

- 2005 annual report completed.
- Conducted nine administrative and technical training sessions for conservation district staff. Conducted 28 program evaluations of delegated conservation district programs.
- Continued to implement, revise and clarify NPDES construction and MS4 program guidance documents to reflect changes in the federal NPDES Phase II regulations.
- Clarified the post construction stormwater management requirements in the application for NPDES permits associated with construction activities

Milestone B. Track and summarize the percent increase in the total reimbursement dollars for regional planning at county and municipal levels to implement nonstructural, proactive NPS pollution control strategies from 1999 levels.

- The Department and members of the Stormwater Management Oversight Committee developed the initial draft of Pennsylvania's stormwater best management practices manual.
- Continue to conduct training for NPDES permit requirements, with special emphasis on post construction stormwater management.

Milestone C. Phase II NPDES Stormwater Permit Requirements are integrated into ongoing state programs.

- NPDES permits for construction activities integrated regulated fill requirements. Site geology, past or present land use, or suspected soil contaminants need to be provided as a screening for potential contaminated runoff from the project site. In addition, the applicant must provide the requested data for the concerned geologic features, soil conditions or existing stormwater discharges.
- The applicant for NPDES permits associated with construction activities must perform environmental due diligence to determine if fill materials associated with the project qualify as clean fill.

- Continue to conduct training for NPDES permit requirements, with special emphasis on post construction stormwater management.
- Traditionally stormwater contributions and reductions were included in the nonpoint source component of TMDLs. Since NPDES permits are now required for MS4s and most construction activities, they are considered part of the point source contribution and reduction efforts.

Milestone E. By 2003 create a Center for Dirt and Gravel Road Maintenance to serve as a permanent clearinghouse and resource to identify, coordinate and fund appropriate research.

- Milestone completed prior to target date.

Milestone F. By 2004, develop and approve an additional 25 Act 167 stormwater management plans.

- The Department continues to encourage municipalities to utilize the Act 167 process to help meet the MS4 permit requirements.
- Statewide, 49 counties have completed 101 storm water management plans involving 865 municipalities. An additional 24 storm water management plans and updates are being prepared and reviewed. To date, more than \$14 million have been appropriated by the legislature for the stormwater management grant assistance program. Municipalities and counties receive the funds as they submit invoices detailing completed work in preparing and updating the plans.
- Stormwater runoff is one of the leading causes of water quality impairment in Pennsylvania, and proper stormwater management is publicly recognized as a priority need in most regions of the Commonwealth. However, the \$1.2 million currently appropriated to the Pa. DEP to help municipalities address stormwater issues is not sufficient.
- Preparation of countywide Act 167 plans for 8 counties are in progress. Secretary McGinty said that beginning next fiscal year, the appropriation will fall far short because of the number of plans already in the pipeline, those in the early stages of development and those federally mandated to be updated in the next five years. Annual deficits of at least \$2.3 million are expected in fiscal years 2005-06 through 2008-09.

Milestone G. Beginning in 2000, each Stormwater Management Plan incorporates water quality design and pollutant reduction.

- Municipal ordinances developed pursuant to Act 167 Stormwater Management Plans approved by the Department require that stormwater BMPs protect and maintain water quality.

- Continue to integrate post construction stormwater management planning into existing stormwater programs.
- NPDES Phase II municipal separate storm sewer system (MS4) permit, PAG-13, requires water quality design and pollution reduction.
- VUSP research and directed studies emphasize comprehensive watershed stormwater management planning, implementation and evaluation. Villanova's research facilities consist of a stormwater treatment wetland, a bio-infiltration traffic island, a large-scale porous concrete infiltration plaza and an infiltration trench. EPA has accepted these facilities as part of the National Monitoring Site program.
- EPA Region III, PADEP, and Philadelphia Water Department (PWD) have partnered together to form the Schuylkill Action Network (SAN) to reduce stream impairment through better stormwater management and to protect high quality streams from potential threats within the Schuylkill River Watershed. The SAN Storm Water Workgroup includes a subcommittee of land management, preservation, and conservation organizations given the critical role of land-use practices. Activities include education, outreach, and the implementation of best management practice (BMP) demonstration projects. Preparation of an Act 167 plan for the Schuylkill watershed is in progress.

Milestone H. Total dollars for reimbursement requests from municipalities for implementation of adequate stormwater management systems and programs to protect health and safety and reduce water quality impacts from storm sewer discharges. By 2004, total reimbursement will increase by 50% over 1999 reimbursement rates.

- Continued to integrate the post construction stormwater management planning requirements

Hydromodification Workgroup

Milestone A: Work has continued on the existing watershed projects that consider the fluvial-geomorphology of the stream in addition to the remediation of the other non-point sources of pollution.

- Report presenting Pennsylvania regional curves entitled Development of Regional Curves Relating Bankfull-Channel Geometry and Discharge to Drainage Area for Streams in Pennsylvania and Selected Areas of Maryland has been published and is also available on the USGS website.
- Report documenting geomorphology-based Broad Run Watershed assessment entitled Environmental Setting, Water Budget, and Stream Assessment for the Broad Run Watershed, Chester County, Pennsylvania has been published and is also available on the USGS website.

- In cooperation with the National Park Service, the USGS will collect and analyze sediment data and monitor turbidity in Valley Creek to compute the sediment record.

Milestone B: Remove 30 dams by 2004 and increase the number of miles of fish passage.

- During 2005, another fifteen dams were modified or removed bringing the total of dams removed or modified to 84. The 15 dams removed opened an additional 69.5 miles to fish passage bringing the total to 518.5 miles of stream habitat now open to migratory fish.
- In 2005 the Bureau of Waterways Engineering started construction on the fish passage facility for Flat Rock Dam on the Schuylkill River.

Milestone C: By 2004, establish monitoring to document less downstream erosion and flood damage and more stable stream habitat after culvert/bridge replacement. (Completed in 2001)

By the year 2005, implement fish passage designs within all new culvert replacement structures that transport waterways with >100 acres of drainage area.

- Process is in place and effectively working. During 2004 approximately two miles of culverted stream with hard bottoms have been reverted back to natural stream bottoms and fish passage.

Milestone D: By 2004, develop and implement procedures that will make possible the evaluation of aquatic habitat loss due to in-stream flow impacts resulting from surface water and groundwater withdrawals on a statewide basis.

- The U.S.G.S. is continuing the aquatic habitat assessments in Chester County.

Milestone E: By 2004, increase by 25 percent the number of municipalities effectively implementing floodplain management over the 1999 baseline. Increase by 10 percent annually the number of "community assisted visits and contacts" to municipalities. Increase by 10 percent annually the number of people attending floodplain and storm water management training.

- During 2005, approximately 75 Floodplain Management Ordinances in conjunction with the Map Modernization, Community Rating System and National Flood Insurance Programs were reviewed and updated.
- During 2005, an additional 50+ ordinances were reviewed and updated.

Milestone F: By 2001, establish a procedure to track the number of stream miles with new buffers and the number of miles of riparian buffers saved from destruction through the permit review process.

- Refer to Agricultural Milestones E & F. The goal has been met and exceeded. Establishing a tracking system for miles of stream buffers saved through the permit process is not feasible. The need to “avoid and minimize” is conveyed through education and outreach and therefore factored in prior to the permit process.

Milestone G: Annually increase by 100 acres the number of wetland acres protected, created or restored.

- DEP tracked 112 acres of wetlands restored/created and 666 acres enhanced for the year. (This is nonregulatory, Partners, etc.) The Commonwealth has restored or created 1766 acres and enhanced 5,657 acres since tracking began in 1998. For more information refer to website www.depweb.state.pa.us click on Subject, choose “wetlands.”

Milestone H: (Completed and Evolving) The national Stream Corridor Restoration Handbook appended for Pennsylvania as a cooperative endeavor of all members of the NPS Hydromodification work group.

- The Keystone Stream Team has it’s own website www.keystonestreamteam.org and Lycoming College’s Clean Water Institute has a 319 grant to create a web-based database for NSCD data.
- Guidelines for Natural Stream Channel Design for Pennsylvania Waterways are on the web and are also being updated.
- DEP watershed academies provide participants with an overview of the Natural Stream Channel Design (NSCD) and the Costs Involved with NSCD.
- The Conservation District Watershed Specialists annual meeting included a session on NSCD.
- Penn State University incorporates stream channel restoration in the curriculum of one Agricultural Engineering course and one Civil Engineering.
- Canaan Valley Institute provides scholarships to assist people in obtaining training in NSCD.
- Mike Lovegreen and the Bradford Conservation District offered two three-day hands-on training sessions for watershed specialists and others entitled: An Introduction to Natural Stream Channel Design.

Silviculture Workgroup

Milestone A. Provide ten workshops per year to communicate consistent information to loggers, landowners, and government officials on best management practices for silvicultural activities.

- In 2005, 157 individuals took Environmental Logging/Advanced Environmental Logging training. On continuing education courses, 259 individuals have taken training. Added to all the environmental Logging Training courses is a video on construction and proper use of portable timber bridges as well as instructions on the correct handling of hazardous spills.
- Two new landowner group was established in 2005. This brings to twenty-three the number of forest landowner groups in Pennsylvania. These forest landowner associations conducted twenty-six workshops and tours for addressing water quality issues as relating to logging and forest management.
- In 2005, the booklets, Controlling Erosion and Sediment From Timber Harvesting Operations and Best Management Practices for Silvicultural Activities in Pennsylvania's Forested Wetlands, were revised and combined into a field manual entitled "Timber Harvest Operations Field Guide for Waterways, Wetlands and Erosion Control". The Professional Timber Harvesters ACTION PACKET was also updated in 2005. It contains the field manual, template "Erosion and Sediment Control Plan for a Timber Harvesting Operation" and GP-8 Temporary Road Crossings general permit package.
- Penn State Natural Resources Cooperative Extension now provides monthly Forest Stewardship News Releases on forest best management practices to forest landowners and agencies.
- An in-service training unit on "Converting Land-Protecting Water" has been developed for presentation to the members of the Pennsylvania Forest Stewards program.

Milestone B. Each year develop one new forest demonstration site in a Service Forest Project Area that incorporate Nonpoint Source Best Management Practices (BMPs) for silviculture.

- "Penns Woods: An Auto Tour of Forest Demonstration Sites", a full color brochure detailing six forest demonstration sites spread across the commonwealth is now available. These demonstration sites introduce landowners and the general public to different methods of timber harvesting along with their benefits and consequences.
- An estimated 400 acres of trees at Blue Knob State Park in Bedford County that were damaged last year by Tropical Storm Ivan are being harvested by helicopter. Chris Jones, a state forester, said the Boeing Vertrol 107-11 helicopter from an Oregon company was used because many trees blew down steep slopes, and the state wants to avoid erosion that could be created by logging roads.

Milestone C. By 2000, develop a self-evaluation form for practitioner/landowner to evaluate BMP installation.

- The self-evaluating timber harvest assessment form has been developed for forest practitioners and landowners to evaluate the effectiveness of BMP installation. It takes the coordination of loggers, foresters, and landowners to complete the form and provide the information.

Milestone D. By 2004, develop a system to establish BMP baseline implementation. By 2010, develop a system to track BMP implementation.

- The form is developed.

Milestone E. Distribute 500 SFI landowner packets per year to inform landowners of their responsibility for minimizing non-point source pollution. Provide ten landowner workshops on silviculture BMPs per year. Enroll 150 new landowners in the Forestry Stewardship Program (FSP) in 2000.

- During 2005, 1,659 SFI packets have been distributed to landowners prior to timber harvesting.
- Landowner enrollment in the Forest Stewardship Program (FSP) continues.

Milestone F. Increase by five per year, the number of articles/publications in immediate circulation to encourage landowners to establish and maintain riparian forest buffers. The number of workshops held on riparian forest buffers. Amount of cost-share dollars provided by SIP.

- The goal to restore 600 miles of riparian forested buffers by the year 2010 has been met. To date, 1,600 miles of forested riparian buffers have been added in the Chesapeake Bay watershed. More than 1,640 miles of forested riparian buffers have been added statewide.
- Free planting stock was provided to landowners planting riparian buffers within the Chesapeake Bay drainage Basin in Pennsylvania. The plants were provided through the organizations working to restore the Bay.
- Plants were also provided through TreeVitalize, a program launched in Pennsylvania to plant more than 20,000 shade trees and add 1,000 acres of forested riparian buffers in Bucks, Chester, Delaware, Montgomery and Philadelphia counties.

Milestone G. Provide 10 new education/outreach/awareness activities that include riparian forest management zones. Increase by 10% the number of management plans that include riparian management zones.

- The new Forestry for the Bay Program, which will roll out in 2006 from the Alliance for the Chesapeake Bay, will require a commitment to riparian management in woodland management plans.
- Nine workshops entitled titled “Plants for Riparian Buffers” were offered to DEP regional staff and PennDOT maintenance crews as well as County Conservation Districts and volunteer groups. These trainings stressed the importance of riparian buffers, the why’s and how’s of establishing them, biodiversity and the use of native plants.
- Pennsylvania’s Nonpoint Management Program has provided grant funds to the Alliance for the Chesapeake Bay to develop a supplement to the Stream ReLeaf Forest Buffer Toolkit that will address detailed maintenance conservation tools for riparian forest buffers. Since riparian buffers have been so successful, maintenance and conservation have been identified as areas where local citizens groups need additional information.
- A new booklet, “Forest Friendly Development, Chesapeake Bay Watershed Case Studies 2005” produced by the Alliance for the Chesapeake Bay, profiles a number of Pennsylvania developers who have used innovative methods through the use of trees to reduce stormwater runoff by increasing infiltration, thereby reducing nonpoint source pollution loads.

Lakes Workgroup:

The new Goals of the NPS Program now better address the Lake Program’s Needs and Progress. Many of the following Milestones from the 1999 Plan have been completed, and others incorporated into new overall Goals.

Milestone A: By 2003, develop a Pennsylvania Best Management Handbook for Lake Management that includes innovative and traditional approaches to lake management and restoration.

- The Handbook was completed and distributed in 2004 and is available to download from the PALMS website: www.palakes.org.
- DEP developed a guideline for requesting the use of alum and other in-lake treatments (e.g. liming) so that a dialogue among all stakeholders (DEP Regional Offices, PFBC) can uniformly decide a procedure for treating a particular lake. At least one TMDL lake will move forward with alum investigations in 2006 with the goal of removing this lake from the impaired to meeting uses listing by 2008.

Milestone B: By 2002, develop a comprehensive Pennsylvania Lakes Classification System.

- This Milestone is now covered under Milestone D.

Milestone C: By 2003, establish a technical and educational clearinghouse of information to address lake management and restoration and provide outreach to public and private lake managers and owners.

- 2005: The annual PA Lake Management Society's (PALMS) conference was held in State College on October 18-19, 2005, continuing to provide an outreach and communication forum on standard and innovative lake management techniques, lake monitoring, and data management. The conference highlight was Dr. Robert Carlson, from Kent State University, world-renowned limnologist famous for developing the Carlson Trophic State Index (TSI), which is a widely used tool to track lake health.
- The PALMS conference convenes and provides a forum for many lake interests, including lake managers, biologists, limnologists, college professors, lake owners and cottagers. Water supply representatives have so far eluded the outreach efforts of PALMS.
- In April 2005, Dr. Winfield Fairchild, Biology Professor at West Chester University, partnering with DEP and PALMS, provided two 1-day workshop on pond management in Chester County, highlighting his Growing Greener grant research results on the status of ponds in that county. His work was "Ecologically Based Small Pond Management" and can be found at <http://www.depweb.state.pa.us/growgreen/hosting/default.asp?ID=1616124323>.
- Through PALMS's association with C-SAW (Consortium of Scientific Assistance to Watersheds, <http://pa.water.usgs.gov/csaw/>), numerous groups were assisted or trained on lake management issues. C-SAW's goal is to assist watershed groups with the intention to empower and educate them to address their own needs. Several conservation districts and citizen groups have used C-SAW to investigate or resolve lake management issues. PALMS and DEP also participated in and helped support the outreach efforts of Penn State Extension, which in 2005 provided a series of pond and lake workshops throughout the State. Topics covered lake/pond ecology and watershed concepts. Six Saturday workshops were conducted:
 - March 19, 2005 - York, PA - 80 attendees
 - May 21, 2005 - Mifflinburg, PA - 18 attendees
 - June 18, 2005 - Hawley, PA - 40 attendees
 - July 9, 2005 - Bedford, PA - 35 attendees
 - July 30, 2005 - Mercer, PA - 45 attendees
 - September 10, 2005 - Greensburg, PA - 21 attendees

Milestone D: By 2003, develop specific NPS TMDL criteria for lakes to reflect lake processes which differ from streams.

- In 2005, new Chapter 93 Water Quality Standards for dissolved oxygen (DO) in lakes resolved many of the listing problems associated with the fact that many lakes stratify in the summer, and hypolimnetic waters become oxygen deficient. DO standards now apply only in the epilimnion of stratified lakes (or lake-wide if not stratified). Temperature standards do not apply to lakes except if affected by a heated discharge. The 2004 303(d) lake list has been reviewed for the 2006 listing. As a result, a number of lakes and acres will be removed from the 2004 Cat 4 List (impaired by pollution but not needing a TMDL) and moved to Cat 2 as meeting aquatic life use.
- According to EPA's new listing guidelines, all lakes (all waterbodies) are now assessed and listed for multiple uses, including aquatic life, recreation, potable water supply, and fish/shellfish consumption. Use of all available data results in listings in the appropriate categories.

Milestone E: By 2002, develop specific BMP guidelines for controlling lakeshore erosion.

- This milestone was covered under Milestone A, but because of the need to document BMP efficacy, the following Action Item, proposed in the new NPS Plan merits a highlight because of progress.

Action Item: Determine the level and frequency of monitoring needed to verify that TMDLs are met.

Several Clean Lakes Projects, originally assessed and impaired in the 1990's (and with approved TMDLs), are being tracked, both in-lake and by tributary inputs, to detect improvements in water quality as BMPs are implemented in the watershed. These include Lake Wallenpaupack (Pike/Wayne Counties), Lake Luxembourg (Bucks County), Harveys Lake (Luzerne County), and Stephen Foster Lake (Bradford County). These lakes are on track for delisting in the next few years. Several more Clean Lakes Projects with TMDLs have made significant but not complete efforts to install watershed BMPs, and will take longer to delist (includes: Conneaut Lake (Crawford County), Pinchot Lake (York County), Lake Galena (Bucks County), Lake Nockamixon (Bucks County). Intensive monitoring includes, on a case-by-case basis, storm and dry event tributary sampling, monthly in-lake monitoring, macrophyte mapping, pebble counts, riparian habitat assessments, macroinvertebrate surveys, and fishery assessments; water quality parameters tracked include nutrients, TSS, chlorophyll-a, and in-situ profile data. It appears that this level of monitoring is required to establish comparative water quality data to document that the waterbody is meeting designated uses.

Milestone F: By 2004, develop a clearly defined strategy to control and mitigate exotic species that directly affect lake uses.

- The Mid-Atlantic Regional Panel (MARF) for Aquatic Nuisance Species (ANS) convened several times in 2005, with Pennsylvania participating with diverse stakeholders including program administrators, and representatives from industry, government and non-government agencies. Bylaws and committees are now established with the goal of assisting states in developing Invasive Species Management Plans. The Panel also serves as a vehicle for information exchange by topic experts.
- The Pennsylvania Invasive Species Council (PISC) has reconvened in 2005 and a Management Plan Committee was formed. This Committee is reviewing management plans from other states in preparation for development of a final Management Plan for PA; this is PISC's top priority.
- Education and Outreach on invasive issues will be an important component of the State Invasive Species Plan. DEP and DCNR have been conducting workshops for state employees, conservation districts, watershed groups and citizens on the identification, prevention and control of invasive riparian, wetland and aquatic plant species. In 2005, DEP/DCNR conducted four workshops and have 3 scheduled for May 2006; demand for these workshops is high. .
- DCNR has also completed an Invasive Species Management Plan for Pennsylvania state parks in 2005. The Plan was based on a recent state-wide survey to document invasive plant problems and needs in all state park lands. For outreach, DCNR publishes an Invasive Plant brochure and a Native Plant brochure, which both contain excellent general information as well as plant lists. Hundreds of these brochures are distributed each year at conferences, workshops etc. More Pennsylvania-specific and aquatic-specific resources are needed. DCNR recently added a web-based Invasive Tutorial designed to assist land managers in invasive species management: (<http://www.dcnr.state.pa.us/forestry/invasivetutorial/index.htm>). The site also lists and organizes many other useful web resources.

Land Disposal Workgroup

Milestone A. Provide on-lot sewage treatment-related training annually to 1,200 sewage enforcement officers (SEOs) and 1,000 local government officials.

- All 1,150 current SEO's and many local government officials have received on-lot sewage treatment training in 2005, though it is difficult to get municipal officials to attend the training sessions which are offered. Creation of the SEO College has institutionalized this training (mandatory for SEOs since before 1994) and improved its organization, quality and program relevance. Updates to the Sewage Enforcement Officer's Guidance Manual and other technical and policy documents are completed and distributed to local officials and regional DEP staff as needed. Efforts are currently underway to utilize registration fees from

septage haulers to provide expanded training opportunities for this group and for on-site system installers as well.

Milestone B. By 2004, increase by 50 the number of local governments that adopt sewage management programs (SMPs) in accordance with Act 537. Also increase the number of on-lot remediation projects funded through PENNVEST.

- As of January 2006, an estimated 153 PA municipalities had adopted SMPs. Without verification, however, it cannot be concluded that every SMP listed under each source is valid, or active, or that there are not other SMPs in the state as yet undiscovered.
- Recent efforts to encourage adoption have moved away from State enforcement to a grassroots approach, where local governments which have successfully implemented a program are encouraged to share their experience with other communities through a peer network.
- From September 2004 through October 2005, DEP personnel participated in least six workshops providing approximately 355 local officials, municipal planners, consultants and SEOs with information on the benefits and working aspects of SMPs. DEP staff also finalized the first two of a proposed series of fact sheets discussing SMP development and implementation and posted eight municipal ordinances on the web, for use by officials designing their own programs. Technical assistance was provided to several municipalities developing their own programs, including Lebanon County, which is implementing the first known county-wide SMP in Pennsylvania.
- Through December 31st, PENNVEST had approved 22 loans in 2005 for remediation (repair or replacement) of on-lot septic systems, with a value of \$273,103. This brought the total number of loans approved since the program's inception to 362, and the total value to \$3,686,494.

Milestone C. By 2001, certify 400 people for land applying biosolids.

- In order to land apply biosolids or residential septage in PA, a facility must be covered under one of three statewide general permits: PAG-07 for Exceptional Quality Biosolids, PAG-08 for Biosolids, and PAG-09 for Residential Septage. To receive approval under one of these general permits or a biosolids individual permit, the products to be applied must meet strict quality standards for pathogen reduction, vector attraction reduction, and pollutants. Through the year 2005, there were 270 facilities permitted to land apply in PA, including 26 exceptional quality biosolids, 156 biosolids, 85 residential septage and three individual generator permittees.
- There are over 800 sites throughout the State approved for biosolids use, including both mine reclamation and agricultural sites. When land applying biosolids, strict management practices (including application rates, land slopes and setbacks from streams, wetlands, and sinkholes) must be followed in order to limit the potential for runoff.

- Once a facility receives approval to beneficially use biosolids, at least one person responsible for land application activities must complete the PA DEP's mandatory training program. This program was initiated in 1998 and, as of December 2005, approximately 1,128 people had completed the training.
- The PA DEP currently maintains three fact sheets on the subject of land application of biosolids. Additional information is available from Penn State University, which has conducted extensive research on the topic over the last 30 years.

Milestone D. By 2002, develop a public service announcement for TV and radio on the proper disposal of household wastes. By 2004, conduct three household hazardous chemical collections per year, 350 Chem Sweeps on individual farms per year and have 950 used oil collection stations located throughout the State.

- A number of public service announcements have been developed and aired in recent years concerning littering and waste recycling. Although no such campaigns have been implemented for farm and household hazardous wastes to date, several brochures, manuals and a video tape have been prepared and distributed Statewide.
- During the period 1999 through 2004, locally sponsored household hazardous waste collections, with financial support from PA DEP, involved an average of 27 communities, 28,583 participants and 1,430 tons of material per year. In 2005, these collections involved 43 communities, 43,744 participants and 2,515 tons of material.
- Over the same period, community pesticide collections averaged 7 per year and Chem Sweeps at individual sites 134. Along with regional storage sites around the State, these activities collected, recycled and properly disposed of an average of 90,160 pounds of pesticides per year. In 2005, 15 community pesticide collections, 229 site-to-site pickups and six regional storage sites accumulated 125,129 pounds of waste pesticides.
- Used oil collection stations around the State numbered 845 on December 31, 2005, a decrease of one from the previous year.

Milestone E. Conduct two environmental and energy audits in each DEP region each year. By 2000, distribute Farm-A-Syst outreach information to all 67 PA counties. By 2001, conduct six Home-A-Syst outreach activities Statewide.

- The DEP's six regional offices conducted a total of about 42 pollution prevention and energy efficiency site visits during 2005, an average of 7 visits per region. The average of visits per region for the years 2002-2004 was just over 14 per year.
- The Farm-A-Syst program continued work on four new worksheets and one revision during calendar year 2005. New publications are being prepared on the topics of pasture management, barnyards and animal concentration areas, winter feeding areas and poultry production. A previous worksheet on stream and drainage way management is currently being revised and updated. The printing of four new worksheets will bring to 15 the total

number of publications developed by this program since its inception. Each of these materials has been distributed Statewide through the Penn State Cooperative Extension network and county conservation district offices.

- By the end of 2005, Penn State Cooperative Extension agents had conducted at least 28 Home-A-Syst outreach activities across the State, with the bulk of those occurring in 2001.